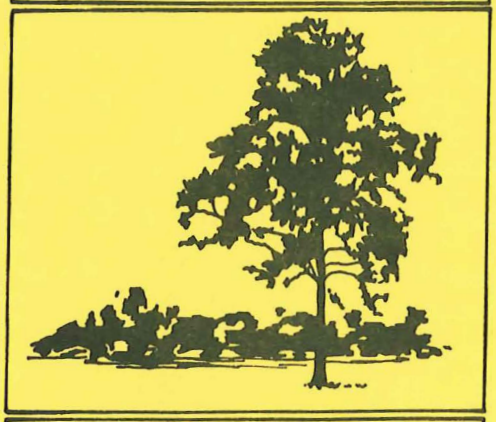


FOREST PEST CONDITIONS IN WISCONSIN

ANNUAL REPORT 1982

DEPARTMENT OF NATURAL RESOURCES
BOX 7921
MADISON, WISCONSIN 53707

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Forest Pest Management
3911 Fish Hatchery Road
Fitchburg, Wisconsin 53711-5397

Carroll D. Besadny
Secretary

8120

File Ref:

TO: Recipients of Annual Reports - Forest Pest Conditionss in Wisconsin - 1982

Enclosed is a copy of the 1982 report.

The 1983 report will be published during the first half of 1984. Please fill in and return the form on the sheet if you wish to receive a copy of the 1983 report.

Allen J. Prey

Allen J. Prey
Supervisor, Forest Pest Management

Please retain my name and address on the mailing list for the Annual Report of Forest Pest Conditions in Wisconsin - 1983, and mail it to:

NAME _____

STREET _____

CITY _____ STATE _____ ZIP CODE_____

Please return the completed form to:

Jane E. Cummings
Forest Pest Management
3911 Fish Hatchery Road
Madison, WI 53711

FOREST PEST CONDITIONS IN WISCONSIN ANNUAL REPORT - 1982

Compiled and Edited by Allen J. Prey, David J. Hall, and Jane E. Cummings-Zarnstorff

DEPARTMENT OF NATURAL RESOURCES
Division of Resource Management
Bureau of Forestry

PREFACE

This record of the activities of forest pests and other destructive agents of growing trees in Wisconsin's forest nurseries, plantations, and natural timber areas was made possible by the dedicated work of pest management personnel in each district and at the Forest Pest Management Laboratory at Nevin Hatchery in Madison. DNR foresters, other department field personnel, cooperators in other public agencies and private forest industry contributed valuable assistance in monitoring the forest lands in all classes of forest ownership.

The information in this report was collected under the supervision of Donald W. Renlund, former Department of Natural Resources Supervisor of Forest Pest Management who retired on February 25, 1983 with over 27 years of state service. Forest pest information from the DNR Lake Michigan District was submitted by Norbert B. Underwood, former DNR Forest Entomologist who retired in March 1983 with 32 years of service. It was through the dedicated efforts of these individuals that the Wisconsin Department of Natural Resources (formerly Wisconsin Conservation Department) became a leader in forest insect and disease survey methods, which resulted in the incorporation of integrated pest management principles into current forest management practices in Wisconsin today.

The directory and map on page one designates the location of the DNR Forest Pest Management Staff as of December 31, 1983.

Allen J. Prey, Supervisor
Forest Pest Management
November 11, 1983

TABLE OF CONTENTS

Forest Pest Control Personnel.....1

ASPEN.....2
Aspen Bronzing . . . Leaf Rust . . . Aspen Blotchminer . . . Forest Tent Caterpillar

BALSAM FIR/SPRUCE.....4
Spruce Budworm . . . Balsam Gall Midge . . . Balsam Twig Aphid

BASSWOOD.....4
Basswood Thrips

BIRCH.....4
Birch Leafminer . . . Birch Skeletonizer

BUTTERNUT.....4
Butternut Canker

CHERRY.....6
Eastern Tent Caterpillar . . . Cherry Scallop Shell Moth

DOUGLAS FIR.....6
Rhabdocline Needlecast

ELM 6
Dutch Elm Disease

HEMLOCK.....6
Hemlock Mortality

LARCH.....6
Larch Needlecast

MAPLE.....7
Squirrel Damage . . . Maple Trumpet Skeletonizer . . . Orangehumped Mapleworm . . .
Wolley Alder Aphid

OAK 7
Oak Wilt . . . Oak Webworm . . . Oak Leaftier . . . Walkingstick

PINE 8
Pine Wood Nematode . . . Red Pine Mortality . . . Scleroderris Canker . . .
Red Pine Shoot Blight . . . European Pine Sawfly . . . Red Pine Sawfly . . .
Redheaded Pine Sawfly . . . Introduced Pine Sawfly . . . Jack Pine Budworm . . .
Pine Tussock Moth . . . Chainspotted Geometer . . . Red Pine Needle Midge . . .
A Needle Midge . . . Red Pine Shoot Moth . . . Saratoga Spittlebug . . .
Pine Spittlebug . . . Pine Bark Adelgid . . . Pine Tortoise Scale . . .
Pine Root Collar Weevil . . . White Pine Weevil . . . Pine Bark Beetles . . .
White Grubs

BLACK WALNUT.....13
Black Walnut Canker and Dieback . . . Walnut Caterpillar . . . Pecan Leaf Casebearer

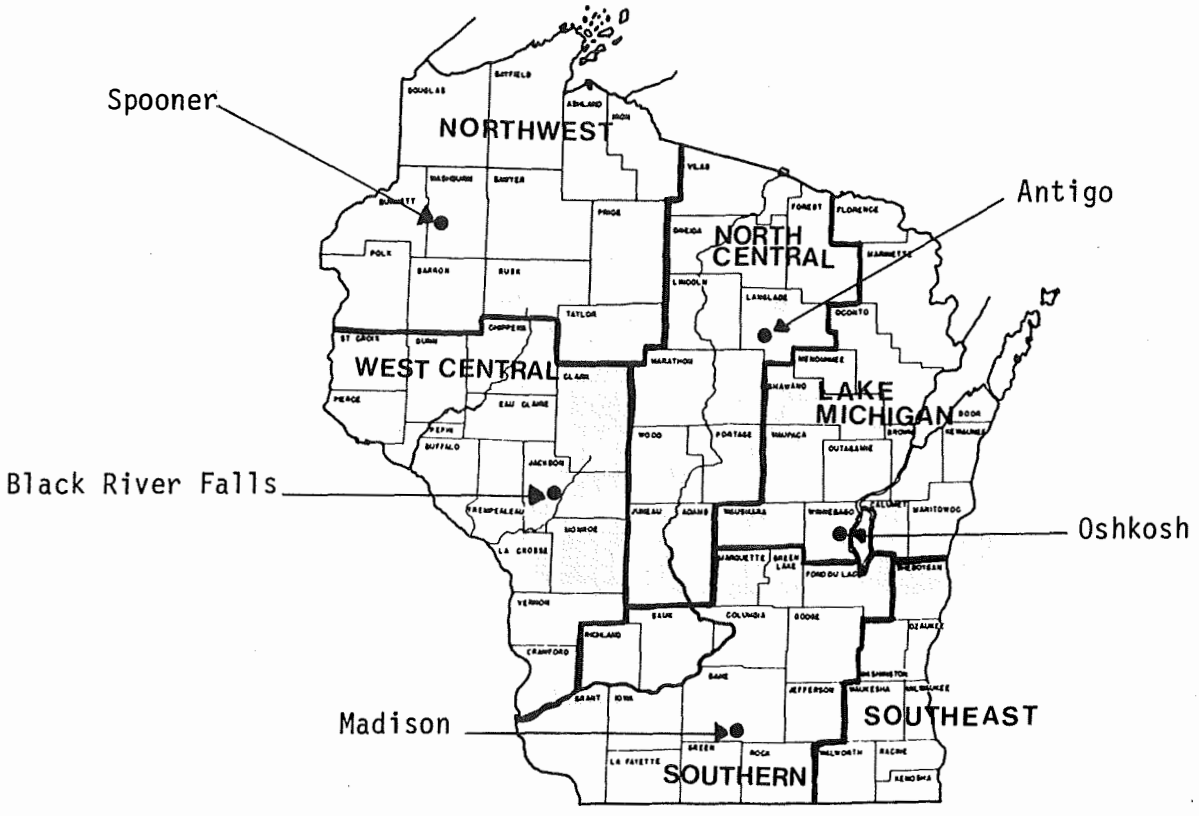
MISCELLANEOUS SPECIES.....13
Gypsy Moth . . . Winter Injury . . . Shoot Blight . . . Hail Damage

NURSRY PROBLEMS
Diplodia Shoot Blight . . . Walnut Seed Rot . . . Black Walnut Seedling Root Rot

APPENDIX A.....15

Department of Natural Resources
Forest Pest Control Personnel December 31, 1982

Name	Title	Address	Telephone
Renlund, Donald W.	Supervisor, Forest Pest Control	DNR, 3911 Fish Hatchery Road, Madison, WI 53711	608-266-3428
Hall, David J.	Forest Entomologist	DNR, 3911 Fish Hatchery Road, Madison, WI 53711	608-266-6926
Prey, Allen J.	Forest Pathologist	DNR, 3911 Fish Hatchery Road, Madison, WI 53711	608-266-2834
Cummings-Zarnstorff, Jane E.	Lab Technician	DNR, 3911 Fish Hatchery Road, Madison, WI 53711	608-266-6926
Groth, Laurie J.	Dutch Elm Disease Coordinator	DNR, 3911 Fish Hatchery Road, Madison, WI 53711	608-266-5678
Krawczyk, Joseph H.	Elm Wood Utilization Coordinator	DNR, 3911 Fish Hatchery Road, Madison, WI 53711	608-266-5678
Banash, Stanley E.	Forest Entomologist	DNR, Ranger Station 1635 Neva Road Antigo, WI 54409	715-623-5601
Morse, Frank S.	Forest Entomologist	DNR, Rt. 3, Box 5 Black River Falls, WI 54615	715-284-5301
Weber, Shane D.	Forest Entomologist	DNR, Box 309 Spooner, WI 54801	715-635-2101
Underwood, Norbert	Forest Entomologist	DNR, Box 2656 Oshkosh, WI 54901	414-424-3056



ASPEN

Aspen Bronzing - Unknown

This disease which causes branch and occational subsequent tree mortality was first observed in 1973 in Menominee County on largetooth aspen. Results of research on Aspen Bronzing have been reported by Martin, R. & J. G. Berbee 1982, "Isolation of a Potyvirus from Declining Clones of Populus," Phytopathology 72:1158-1162. The current distribution of known locations of Aspen Bronzing is shown in Figure 1. Descriptions of these locations are given in the Forest Pest Conditions in Wisconsin Annual Report - 1979.

Leaf rust - Melampsora medusae Thum.

Widespread infections of this disease occurred on young Poplar stands in Sawyer and Price Counties. Leaf discoloration with some areas of moderate defoliation were observed.

Aspen Blotchminer - Phyllonorycter tremuloidiella (Braun)

Scattered pockets of leaf mining occurred accross the northern tier of counties from Douglas to Forest County and in Langlade County. The heaviest concentrations occurred in Forest County where damage ranged from 2 - 90%.

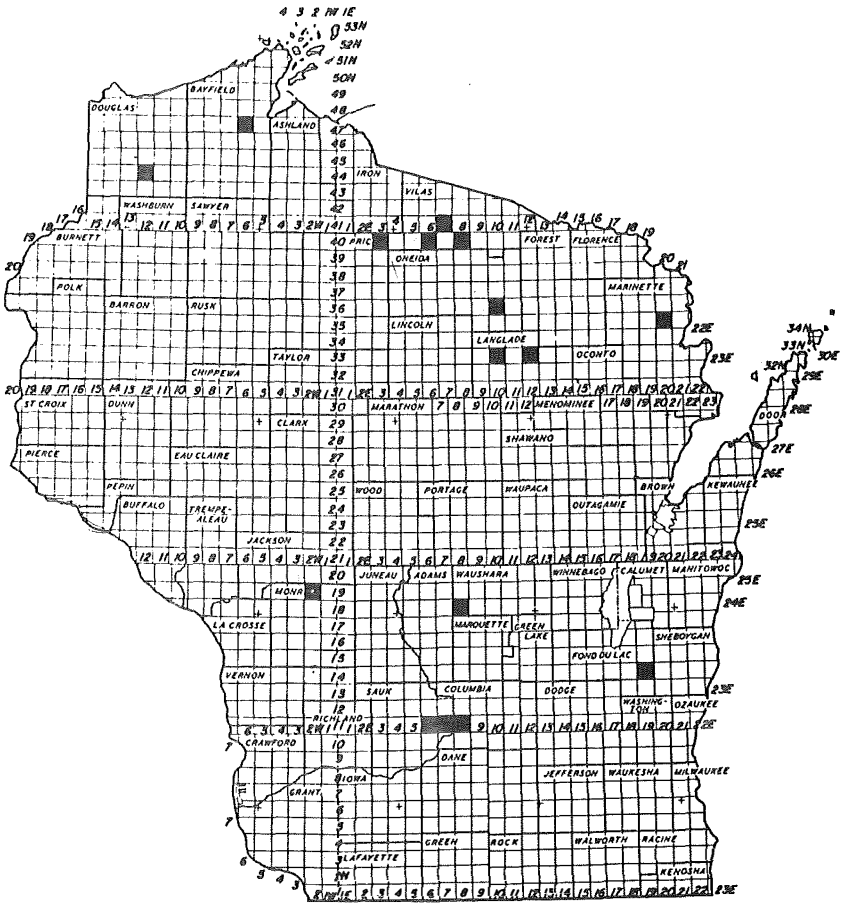


Figure 1. Township locations of Aspen Bronzing in Wisconsin - 1982.

Forest Tent Caterpillar - Malacosoma disstria (Hubner)

Heavy defoliation of aspen continued in the northern counties (Figure 2). The overall estimated area of defoliation decreased to about 1,000,000 acres.

In older areas of the infestation, in Douglas and Bayfield Counties populations have collapsed locally; a sharp decline is expected in this area in 1983. In the newer areas of the infestation in Ashland County populations remained high. In Iron and Vilas Counties, scattered pockets of light defoliation occurred; intensity of defoliation may increase in these areas in 1983.

Some aspen mortality occurred in Superior City Forest, Douglas County, which suffered 4-5 consecutive years of heavy defoliation. Other cities reporting infestations were Tomahawk, Eagle River and Rhinelander.

Phenological notes:
May 21-Larvae 1/2-3/4 inches long in Washburn County.

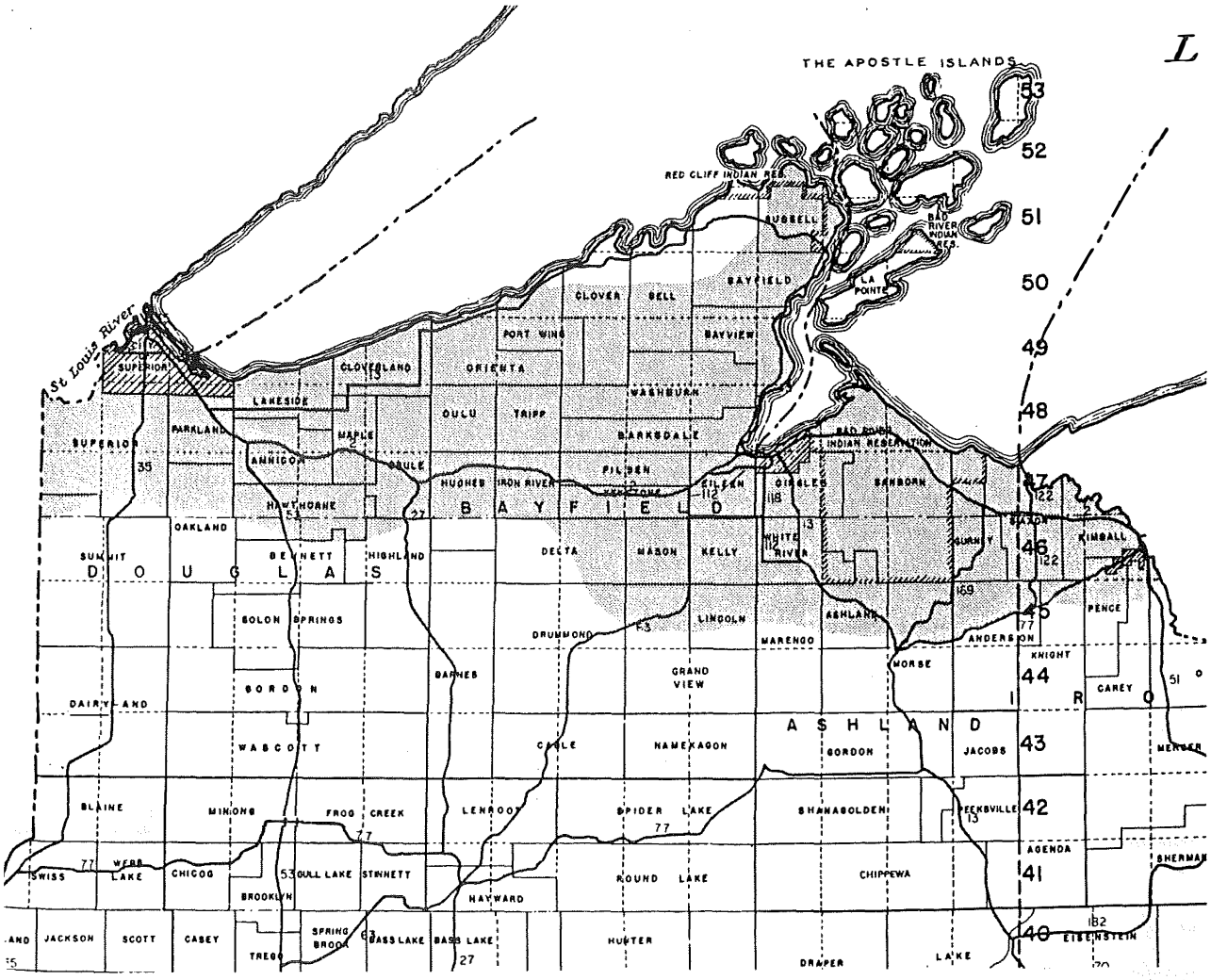


Figure 2. Area of moderate to heavy defoliation by the Forest Tent Caterpillar in Wisconsin - 1982. Map prepared by USDA Forest Service, Insect and Disease Management, St. Paul, MN.

BALSAM FIR - SPRUCE

Spruce Budworm - Choristoneura fumiferana (Clemens)

No defoliation could be found in the northeastern counties where a 13-year outbreak collapsed in 1980 and 1981. Late larval counts indicated a population of less than one larva per 15 inch branch. Parasitism was high in the few larvae and pupae that were counted. Mortality in balsam fir continues in areas that were heavily defoliated in 1979 and 1980.

In Sawyer and Price Counties two new areas of defoliation were observed on U.S. Forest Service land.

Phenological Notes:
May 26 - Early 4th instar larvae observed in Langlade and Oconto Counties.
June 2 - Larvae in 5th instar in Langlade and Oconto Counties.

Balsam Gall Midge - Paradiplosis tumifex (Gagne)

Heavy infestations occurred in natural and planted balsam fir in Langlade, Forest, and Oneida Counties. Infestations in Marathon, Lincoln and Vilas were somewhat less severe. Damage on natural balsam saplings was the most severe in recent years. Some Christmas tree growers had 50 percent of their balsam rendered unsalable this year.

A field test was conducted in cooperation with University of Wisconsin, Department of Entomology to determine the efficiency of phosphorothioate in protecting Christmas trees from attack. A publication is in preparation.

Balsam Twig Aphid - Mindarus abietinus (Koch)

One 40 acre planting in Marathon County received light to moderate damage.

BASSWOOD

Basswood Thrips - Sericothrips tiliae (Hood)

New areas of defoliation were observed in several northeastern counties and one southwestern county and now is known to be present in scattered pockets on about 20,000 acres (Figure 3). The crowns were generally 25-50% defoliated. A few pockets had 75-100% of the foliage missing.

The condition is not easily noticed; it is probable that a lot of this damage is going unreported. In those areas which were defoliated in 1981 the damage was generally reduced in 1982. No basswood mortality has been observed associated with this insect.

BIRCH

Birch Leafminer - Fenusa pusilla (Lepeletier)

Damage declined in the northwestern counties of Douglas, Washburn, Sawyer and Price. Moderate to heavy damage in white birch stands occurred in Eastern Oneida and Vilas counties. Heavy damage to ornamentals occurred in Lincoln, Langlade and Marathon counties.

Birch Skeletonizer - Bucculatrix canadensisella (Chambers)

The scattered state-wide infestation of 1981 collapsed over most of Wisconsin. The only infestations reported were in eastern Lincoln and central and eastern Langlade counties where heavy to severe defoliation occurred.

BUTTERNUT

Butternut canker - Siroccoccus sp.

Butternut canker has been reported in twenty counties since it was first recorded in southwestern Wisconsin in 1967 (Figure 4). No new locations of this disease were reported in 1982.

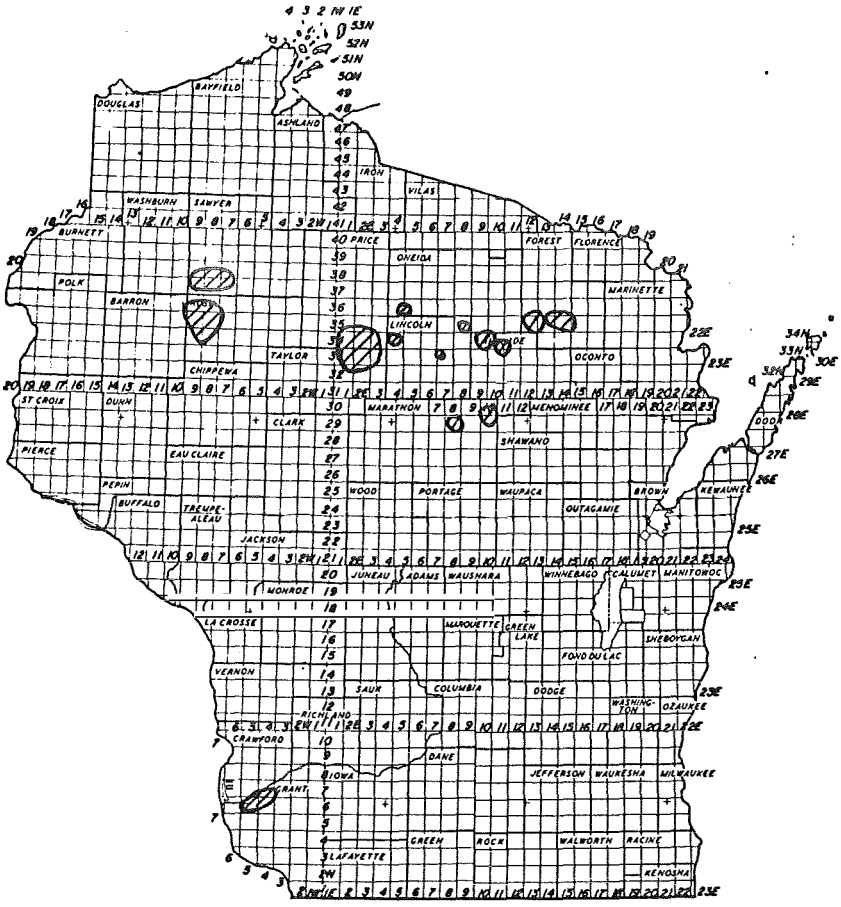


Figure 3. Areas of defoliation by Basswood Thrips - 1982.

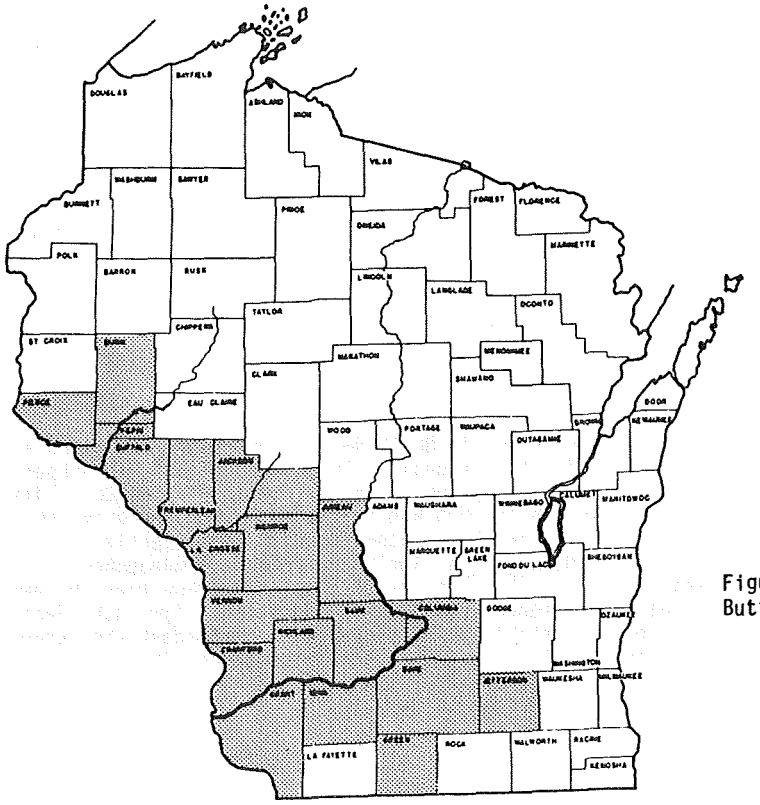


Figure 4. Known county distribution of Butternut Canker in Wisconsin - 1982.

CHERRY

Eastern Tent Caterpillar - Malacosoma americanum (Hubner)

The outbreak was generally reduced in intensity although numbers of tents were locally extremely high in Columbia, Dane, Jefferson, Green and Walworth counties. Some activity was noted in Langlade County.

Phenological notes:

April 24 - newly emerged larvae on egg mass in Dane County
May 3 - Tents up to two inches long in Dane County
May 26 - Larvae 2 inches long in Dane, Rock and Green Counties

Cherry Scallop Shell Moth - Hydria prunivorata (Ferguson)

Pockets of Defoliation of black cherry were observed over a wider area than in 1981 in Washburn, Polk, Waupaca and Outagamie Counties.

DOUGLAS FIR

Rhabdocline Needlecast - (Rhabdocline pseudotsugae) Syd.

Needlecast caused by the fungus Rhabdocline pseudotsugae was collected from a Douglas fir Christmas tree plantation in Door County. This is the second report of the disease in Wisconsin. The first report was in 1978 from a Douglas fir Christmas tree plantation in Bayfield County in northwestern Wisconsin.

ELM

Dutch Elm Disease - Ceratocystis ulmi (Buisman) Moreau

In 1982, approximately 80% of the pole-size and larger elms in Wisconsin were infected with Dutch Elm Disease. This disease is distributed state-wide. The Dutch Elm Disease demonstration control and the elm wood utilization programs were ended due to a termination of federal funding. Studies on effective safe storage of elm for fire wood to prevent disease spread from emerging bark beetles, resulted in a method of covering stored elm firewood with 6-mil, clear polyethylene during bark beetle emergence. Control of bark beetle spread and lowering wood moisture content resulted from this method, see Krawczyk, J. H., et al. 1982, Journal of Arboriculture 8(11):292-295; and Krawczyk, J. H., et al. "Using Elm for Firewood", University of Wisconsin Extension Publication A3185. The DED demonstration control program involved 20 municipalities in Wisconsin and control of DED was emphasized through the inventory, survey, sanitation, disposal/utilization of elm wood, root graft control and injection for prevention. A summary of this four year program is published in the National Dutch Elm Disease Demonstration Program, State Summary Report, 1978-1981, Minnesota DNR, Dutch Elm Disease Program.

HEMLOCK

Hemlock Mortality

This problem is unique to the Menominee Tribal Forest which has a large volume of mature and overmature hemlock. The mortality is caused by a combination of factors including overmaturity of trees, presence of Armillaria root rot, the hemlock borer and periods of drought. Data from a survey taken every 10 years on hemlock mortality on the Monominee Tribal Forest, showed approximately 1507 MBF/yr. of hemlock has died from disease, insect, severe weather, or logging damage, from 1970-1980. Dead timber that is cut and utilized is not included in this figure.

LARCH

Larch Needlecast - Mycosphaerella laricina (Hartig)

Mycosphaerella needle cast of European larch was first reported in North America in 1980. Locations were listed in the 1981 Annual Report of Forest Pest Conditions in Wisconsin. Two new locations were reported in 1982; one in an Oneida Co. windbreak (T38N, R7E, Sec. 10) and one on a single tree in Jackson Co. (City of Black River Falls, T8N, R3W, Sec. 23). In 1981, a research project was initiated in a cooperative agreement between the USFS, North Central Forest Experiment Station, and the Wisconsin DNR. The objective was to obtain information on the life cycle and host range of M. laricina, including potential management strategies to minimize the impact of this disease. Preliminary results of this study show that the amount of infection on small trees decreased with increasing distance from an infected stand. Tamarack, Japanese larch, and European larch have all been shown to be susceptible to Mycosphaerella needlecast when grown under conditions optimum for infection and subjected to high inoculum loads. The susceptiblity of tamarack growing under natural conditions remains to be determined. Research will continue in 1983.

MAPLE

Squirrel Damage

Squirrels gnawed the bark of sapling sugar maple in a Dodge County woodlot. A pocket of about an acre was involved. Most of the attacks were at the base of the saplings; some were as high as 3 feet from the ground. None of the attacks completely circled the tree. Most of the attacks appeared to originate at small stem cankers.

Maple Trumpet Skeletonizer - Epinotia aceriella (Clemens)

Defoliation of sugar maple was greatly reduced from 1981 levels. Scattered light defoliation was observed from Sawyer to Vilas County and in Manitowoc County.

Orangehumped Mapleworm - Symmerista leucitys (Franclemont)

The outbreak in the northern counties collapsed in most areas. Some defoliation was observed near Park Falls in Price County and some light populations were reported in western Oneida and Vilas counties.

Wolley Alder Aphid - Paraprociphilus tesselatus (Fitch)

Heavy infestations occurred on silver maple along river banks and on ornamentals in central Langlade and eastern Lincoln and Marathon Counties.

OAK

Oak Wilt - Cerctocystis fagacearum (Bretz) Hunt

An extensive aerial survey on July 7 for oak wilt followed by a ground check was conducted in northeast Wisconsin in 1982. Confirmation of the presence of the disease at two locations near Legend Lake in Menominee County extends the northward limit of its known distribution in the state (Figure 5).

Oak Webworm - Archips fervidanus (Clemens)

The heavy infestations in Douglas, Burnett and Washburn Counties declined sharply in 1982.

Figure 5. County distribution of Oak Wilt in Wisconsin, 1982.

PINE

Pine Wood Nematode - Bursaphelenchus xylophilus (Steiner and Buhrer)

Initial concern over the pinewood nematode is subsiding. Its presence has been confirmed in 22 widely scattered counties, and it has been declared a native in the U.S. No new locations were added to the known distribution in 1982.

Red Pine Mortality

Two pockets of red pine mortality in Sauk County originated about 10 years ago and still continue to spread. Intensive investigations have failed to reveal the cause. In 1980 it was believed the pine wood nematode (which was present in the dead trees) might be involved in the mortality so we undertook a two-year test of sanitation to prevent further spread of the mortality.

In 1981 and 1982 the dead and dying trees in the perimeter of one pocket were removed; dead and dying trees were left standing in the other pocket. Red pines continued to die in both pockets in 1982. We concluded that the nematode although present in the dead trees was not the primary cause of mortality; the mortality remains unexplained.

Scleroderris Canker - Gremmeniella abietina (Lagerb.)

No new locations of this disease were reported in 1982 and no new tree mortality from this disease in previously infected plantations was observed. There are nine known plantations with Scleroderris Canker in Wisconsin infected with the Lake States stain of Scleroderris (Figure 6). Surveys will be made biennially in Bayfield and Vilas Counties for possible new locations.

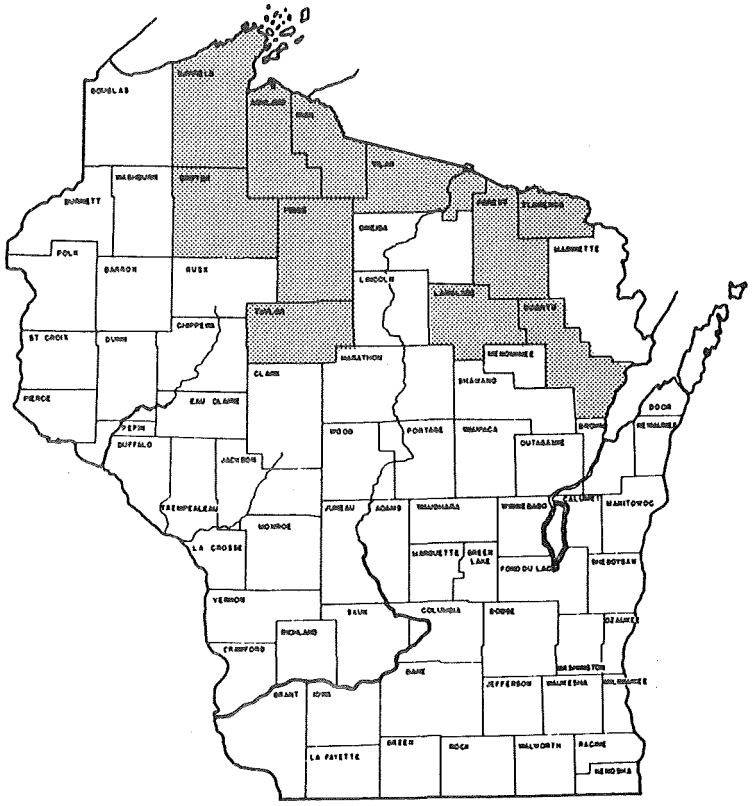


Figure 6. County distribution of Scleroderris canker in Wisconsin - 1982.

Red Pine Shoot Blight - Sirococcus strobilinus (Pruess)

Increased infection of current year's shoots occurred on previously infected red pine sites in north central Wisconsin. No new county locations were reported for this disease (Figure 7).

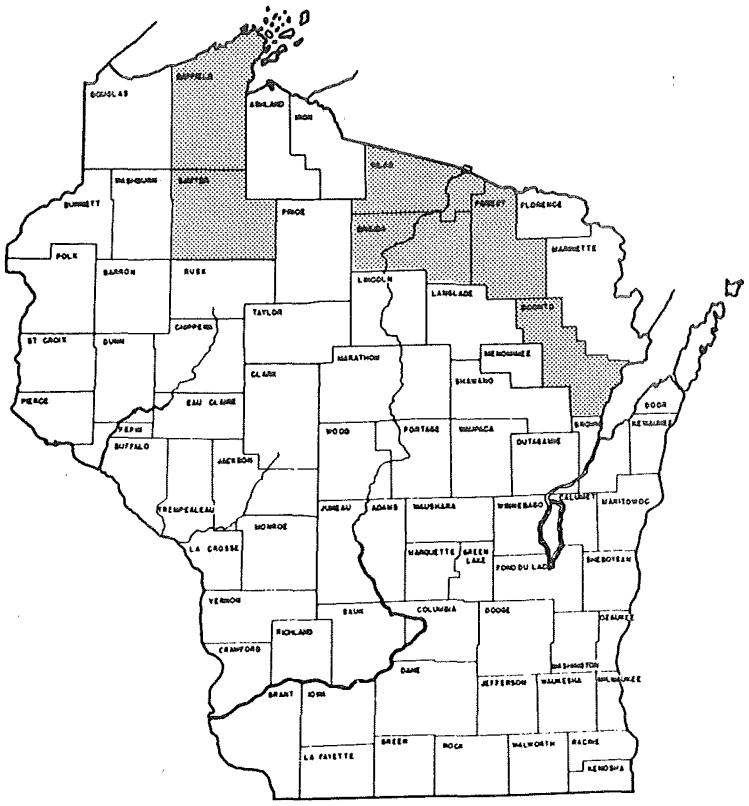


Figure 7. County distribution of Red Pine Shoot Blight in Wisconsin - 1982.

European Pine Sawfly - Neodiprion sertifer (Geoffroy)

Due to very heavy egg mortality, caused presumably by low January temperatures, the general level of defoliation of red pine was significantly reduced. The area of light to heavy defoliation was only slightly reduced to about 1400 acres.

The parasite Lophyroplectus oblongopunctatus increased in numbers so that adults were commonly observed in the field 330 yards from the original release site. The parasitism rate in this location was 4.5% in 1980 and 17% in 1981.

Virus symptoms were scarce and did not become apparent until larvae were nearly finished feeding in early June. A total of four sawfly populations in the southern counties were innoculated with virus using contaminated adult L. oblongopunctatus: two in Waukesha County (NENW Sec. 26, T7N, R17E; SESE Sec. 17, T6N, R17E); one in Dane County (SESE Sec. 34, T6N, R8E); and one in Grant County (NWNW Sec. 14, T6N, R4W). A few diseased larvae were observed in one of the innoculated populations; further evaluation of the releases will be done in 1983.

Phenological Notes:
- May 4 - Eggs beginning to hatch in Walworth and Waukesha Counties
- May 11 - Hatch nearly complete
- May 25 - Larvae in 4th and 5th instars in Waukesha County
- June 8 - Larvae in Walworth, Waukesha and Grant Counties are in the last instar and starting to drop to the ground

Red Pine Sawfly - Neodiprion nanulus nanulus (Schedl)

The area defoliated decreased. An old infestation was collapsing in Columbia County due to heavy parasitism. Extremely heavy defoliation of red pine was observed in Marquette County (NESW, Sec. 35, T14N, R9E).

Phenological notes:
May 18 - Larvae in 3rd instar in Marquette and Columbia Counties

Redheaded Pine Sawfly - Neodiprion lecontei (Fitch)

A population in Forest County remained high in 1982 despite being sprayed in 1981. This 12 acre red pine plantation (SESW Sec. 13, T37N, R14E) was used in a cooperative study with the US Forest Service to determine the efficacy of spray applications of nucleopolyhedrosis virus in reducing sawfly populations. Two concentrations gave different levels of larval mortality and foliage protection. A publication is in preparation.

Phenology:
June 22 - Females laying eggs in Forest County
July 7 - Eggs hatching in Lincoln
July 7 - First hatch in Forest County
July 20 - Some eggs still hatching; most larvae in second instar; some in fourth instar in Forest County
August 10 - Most larvae in last instar in Forest County
September 1 - A few larvae still feeding in Forest County

Introduced Pine Sawfly - Diprion similis (Hartig)

This sawfly was common in Burnett, Washburn, Polk and Barron Counties where light defoliation of some open-grown white pine occurred.

Jack Pine Budworm - Choristoneura pinus (Freeman)

The infestation of jack pine budworm in Douglas and Bayfield Counties intensified in 1982. While the size of the infestation remained static at 135,000 acres, more of the affected area suffered moderate or heavier defoliation this year than in 1981. For the present the bulk of the area still exhibited only very light or light defoliation despite supporting large budworm populations. No tree mortality can be attributed solely to budworm this year.

The abundance of egg masses revealed in the 1982 survey indicates a potential for increased severity of defoliation in the infested area. The eastward spread of the outbreak seen in previous years appears to be over and both the size and location of the outbreak region should be nearly identical next year. Heaviest defoliation is predicted for the towns of Gordon, Highland, and Barnes.

Budworm populations in Polk, Burnett, Washburn, Vilas and Menominee Counties remained low in 1982. Late larval counts on 15 inch branches in Vilas and Menominee Counties revealed only 3 larvae were on 180 branches. No dramatic change is anticipated for 1983.

Pine Tussock Moth - Dasychira pinicola (Dyar)

The potentially devastating tussock moth outbreak in Douglas and Bayfield counties subsided dramatically in 1982. The total area of defoliation dropped from over 40,000 acres last year to under 25,000 acres this year. Defoliation was generally light to moderate, but about 1000 acres suffered severe defoliation with considerable topkill and tree mortality. The southern end of the infestation in Gordon township had static to slowly declining populations while Highland and Barnes townships witnessed a precipitous population crash.

The outlook for tussock moth is continued decline with heavy mortality of overwintering larvae caused by the fungus, Beauveria bassiana over the entire area. The summer of 1983 may very well mark the end of this tussock moth outbreak. One negative note must be mentioned. Large numbers of severely defoliated trees from previous years are succumbing to secondary attacks from bark beetles.

Chainspotted Geometer - Cingilia catenaria (Drury)

A 20 acre planting of 35-40 year old white pine was heavily defoliated in Portage County (SWNE Sec. 18, T23N, R10E). Many large larvae were observed on drooping and hanging by the abdominal legs, the normal symptoms of a virus disease.

Red Pine Needle Midge - Thecodiplosis piniresinosae (Kearby)

The population decline continued in 1982. Only a few reports of defoliation from the northernmost counties were received.

A Needle Midge - probably Contarinia sp.

Heavy browning of pole sized red pine occurred in individual plantations in Juneau, Marquette, Vilas, Oneida and Langlade Counties. The plantations in Juneau and Marquette Counties had been thinned one or two years prior to the outbreak.

Red Pine Shoot Moth - Dioryctria resinosella Mutuura

This shoot attacking species was previously lumped with the Zimmerman Pine Moth, Zimmerman Pina Moth, D. Zimmermani (Grote). See Mutuura, A. 1982. American species of Dioryctria from Eastern Canada and Northeastern United States. Can. Ent. 114:1069-1076.

An outbreak lasting up to ten years in parts of the hazard zone (Figure 8) destroyed half the height growth (during the outbreak) in many pole-sized stands. Stem form has been distorted to varying degrees depending upon the number of years attached.

The outbreak collapsed in 1982 over the entire hazard area. Some locations had heavy larval numbers in May that disappeared before July.

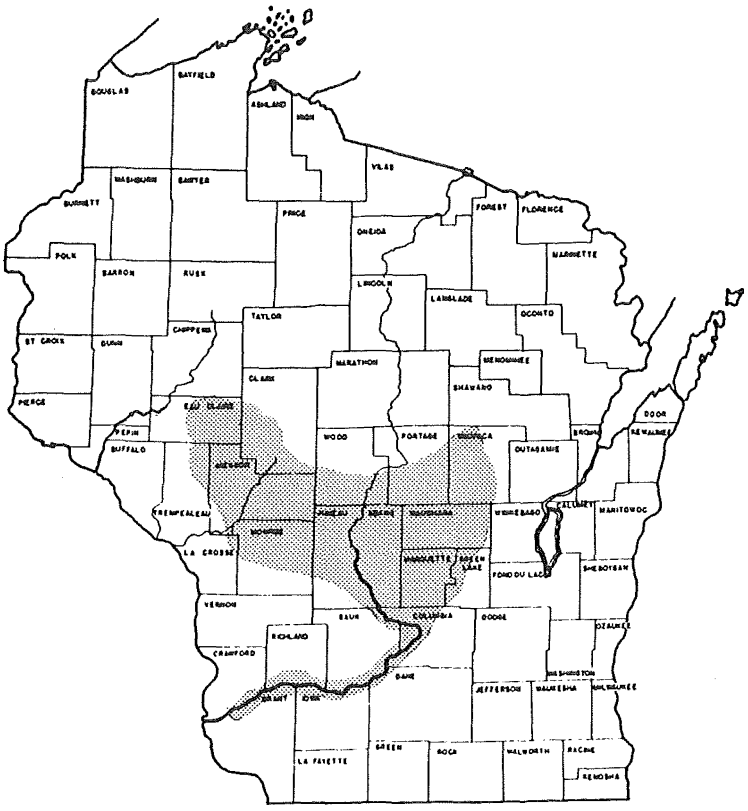


Figure 8. High hazard zone for occurence of the Red Pine Shoot Moth in Wisconsin - 1982.

Saratoga Spittlebug - Aphrophora saratogensis (Fitch)

Populations were very light. Two thousand acres of red pine plantations were surveyed in Vilas and Menominee Counties; none required treatment.

Pine Spittlebug - Aphrophora parallela (Say)

Populations generally decreased from 1981 levels. Spittle masses were common on Jack pine in Douglas, Jackson and Iowa Counties. They were also observed on Scotch pine and balsam fir in Langlade County and on Scotch pine Christmas trees in Marathon County.

Phenological notes:
June 23 - numphs in 3rd instar in Langlade County.

Pine Bark Adelgid - Pineus strobi (Hartig)

Populations on white pine declined substantially in the central and southern counties. Some populations remained high in Grant County.

Pine Tortoise Scale - Toumeyella parvicornis (Cockerell)

Scattered heavily infested jack pines were observed throughout the jack pine type in central Oneida County.

Pine Root Collar Weevil - Hylobius radicis (Buchanan)

Mortality of red and scotch pine generally continued at about 1981 levels. The heavy population in the red pine seed orchard at Avoca continued at high levels.

White Pine Weevil - Pissodes strobi (Peck)

An unusually high number of red pine were attacked in Forest and Bayfield Counties. Heavy infestations of scotch pines were observed in Waushara and Jackson Counties. A moderate infestation in white pine was observed in Polk County.

Pine Bark Beetles - Ips sp.

Pine bark beetles killed many jack pines in Douglas and Bayfield counties that had survived heavy defoliation by the pine tussock moth in 1981. Occasional spots of mortality occurred in this area associated with summer salvage operations.

White Grubs - Phyllophaga sp.

Several new red pine plantations suffered 30-50% mortality from white grubs in Washburn County (T42N, R12, 13W). Some grub caused mortality was observed in eastern Marathon County red pine plantations. Considerable damage was observed in balsam fir seedlings in a private nursery in eastern Langlade County.

BLACK WALNUT

Black Walnut Canker and Dieback

Recently, a verticle, elongate, and sometimes girdling canker has severely damaged and even killed young walnuts in plantations. A Fusarium sp. has been isolated repeatedly and has induced cankers on stem - inoculated walnut, butternut, and Japanese seedlings and saplings. Meanwhile, this stem canker has been complicated by collar rot, branch canker associated with Phomopsis sp., and twig dieback with Phyllosticta sp. Current research at the Department of Plant Pathology, University of Wisconsin - Madison seeks to clarify the significance and relative roles of these different fungus pathogens.

Walnut Caterpillar - Datana integerrima (Grote)

Some defoliation was reported in Brown and Jefferson Counties.

Pecan Leaf Casebearer - Acrobasis juglandis (LeBaron)

Damage to expanding buds was heavy in many walnut plantations in Iowa, Grant and Richland Counties. The overwintering populations are very high and 1983 damage is expected to be very heavy.

MISCELLANEOUS SPECIES

Gypsy Moth - Lymantria dispar (L.)

Known infestations continued but at greatly reduced levels due partly to severe January temperatures and partly to treatments.

The infestation at Oconomowoc and Okauchee Lakes (Waukesha county) was trapped with 3 traps per acre baited with (+) disparlure; 19 male moths were caught.

In the Monona (Dane County) infestation two egg masses were collected in February and lab reared; none hatched. The egg mortality was presumably due to the low January temperatures which fell to -26^{0}F. Burlap bands were placed on many trees in the center of the infestation; 31 larvae and pupae were collected. The area was trapped with 3 traps per acre; 113 males were caught.

In Delavan (Walworth County), where 14 males were caught and 1 egg mass collected in 1981, 4 males were caught this year.

In Mellen (Ashland County) where 2 males were caught in 1981, 8 were caught in 1982.

A new infestation was found at Elm Grove (Waukesha County) where 91 males were trapped and a live female was caught by hand.

A possible new infestation was detected on the west side of Madison. Table 1 summarizes the trap catches in the infesation and many miscellaneous catches that probably do not represent infestations.

Table 1 Gypsy Moth Trap Catches - Wisconsin 1982

County Where Trapped	Number
Ashland	8
Dane*	138
Kenosha	1
Milwaukee	29
Outagamie	3
Racine	3
Rock	1
Walworth	4
Waukesha**	91
Winnebago	2
Total	280

*31 immature forms were also trapped.
**1 adult female was captured.

Winter Injury

Seedling and pole-size sugar maple leafed out and wilted early in June in isolated areas in Ashland and Langlade Counties. In Ashland County, up to 90% of all sapling maples in some areas were killed at the snowline. The stem below the snowline was alive and produced new sprouts.

Progressive mortality is occurring in saw timber and pole-size American beech in Menominee County (Menominee Indian Reservation). Many of the trees failed to leaf out or produce normal shoots following a dry fall and an unusually rigorous winter. Epicormic branching was common on surviving trees.

Shoot Blight - Sphaeropsis ellisii Sacc.

Light damage occurred on plantation grown blue spruce in Langlade County.

Hail Damage

On July 17, 1981, a hail storm did extensive damage to buildings, agricultural crops, and trees in west central Wisconsin. The most severe damage to trees occurred in Eau Claire and Chippewa Counties (Figure 9), where red, white, and jack pine, and Norway spruce were damaged. Hardwood stands of oak and poplar were also affected. In 1982, mortality of scattered hardwoods was occurring and conifers and hardwoods showed ragged crows with flagging branches. Other small acreages of lesser damaged trees occurred in Clark and Jackson Counties.

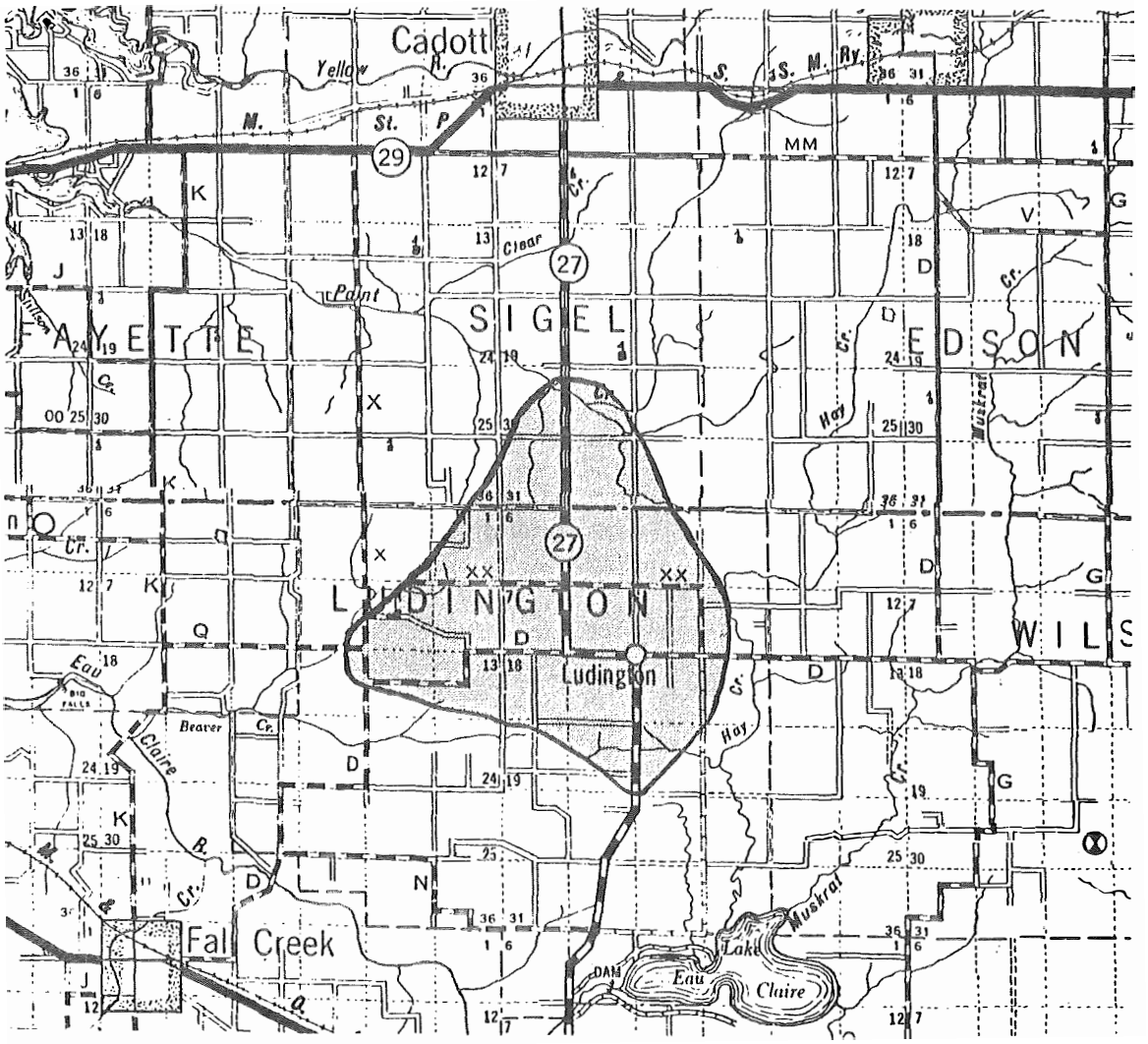


Figure 9. Area in Eau Claire and Chippewa Counties where severe hail damage to trees occurred.

NURSERY PROBLEMS

Diplodia Shoot Blight - Diplodia pinea (Desm.) Kickx.

Diplodia shoot blight continues to infect red pine shoots at Wilson and Griffith State forest tree nurseries. Research in 1982, by the North Central Forest Experiment Station, U.S. Forest Service included evaluating effectiveness of the fungicide benomyl in pilot sprays of 2-0 and 3-0 red pine, repeating the 1981 study for determining the proper benomyl spray schedule for 1-0 seedlings to confirm the 1981 results, and continuing studies initiated in 1981 on Diplodia inoculum sources to determine the most important sources in the nurseries. A summary of results of this research is in Appendix A.

Walnut Seed Rot - (Unknown)

This disease continues to affect walnut seed germination at Wilson State Nursery. Research at the University of Wisconsin, Madison, Department of Plant Pathology, is centered on the possible role of an insect vector and the epidemiology of this disease.

Black Walnut Seedling Root Rot

Seedling root rots have limited the production of 1-0 walnut planting stock at F. G. Wilson State Nursery, Boscobel, Wisconsin. The root rots may develop in the seedbeed during the growing season, but are especially destructive in overwinter storage of planting stock. Research at the University of Wisconsin - Madison, shows that both adverse environmental factors and biotic agents including soil-borne fungi are involved. Straw mulches, as well as heavy snow, greatly reduced root rot overwinter in undisturbed seedbeds and in healing-in beds. Also, no root rot occurred in bare-rooted seedlings stored overwinter in Kraft paper bags at 0-3°C.

Appendix A

Effect and Timing of Benomyl Sprays in Controlling Diplodia Shoot Blight on Red Pine Seedlings.

Marguerita Palmer and Thomas Nicholls[1]

Benomyl reduced Diplodia infection in 1-0, and in 3-0 red pine at Wilson nursery even though sprays were not applied until after the most susceptible period for infection had passed. Sprays should begin in late April, as shown in the infection and spore dispersal studies but due to delays caused by weather and other factors, the first spray was not applied until May 20. A fungicide spray on 2-0 seedlings may not be necessary if good control is achieved from spraying 1-0 seedlings the previous year. It is important to control infection in 1-0 seedlings since this is where the majority of losses occur. Displodia infection on 1-0 seedlings can be reduced from 2 benomyl sprays applied in August, although 4 or 6 sprays applied July - August or June - August provide better control. Similar results were found in 1981.

The major sources of Diplodia inoculum in nurseries are infected red pine seedlings and cones. Cones on trees pose more of a threat than those on the ground.

Diplodia infection can be reduced in nurseries from a combination of management techniques: a fungicide program as described above, rogueing infected seedlings, and eliminating or reducing important sources of Diplodia inoculum.

[1]Associate and Principal Plant Pathologists, North Central Forest Experiment Station, USDA Forest Service, St. Paul, MN